DTE ENERGY'S COMMENTS ON THE USE OF FOREST CARBON SEQUESTRATION TO ADDRESS GLOBAL CLIMATE CHANGE

The Administration has called on companies to take significant voluntary steps to reduce net CO_2 emissions. In an effort to respond to this call in a meaningful way, DTE Energy – one of the nation's larger producers of electricity, much of it from coal – has spent considerable time evaluating its options to reduce emissions. After months of study, we have come to a number of conclusions:

- We have opportunities to reduce CO_2 emissions by investing to improve the efficiency of our coal-fired generation fleet, and we are moving to make these investments. However, these investments – though significant in their near-term impact – are finite in number and ultimately fail to provide a viable longer-term approach.

- We are also investing to expand the output of our nuclear plant by 10%. This project, and others like it across our industry, can substantially contribute to CO_2 emissions reductions but, again, are finite in number and, over time will need to be complemented by other approaches.

- Renewables, especially biomass and wind, can also contribute to a reduction in net CO_2 emissions. We are investing heavily in energy production from biomass in landfills – we currently operate 32 landfill-gas fired facilities. We are also evaluating investments in wind generation. It is our judgment, though, that even if aggressively developed, renewables will require several decades to substantially impact net emissions.

- Changes in the nature and mix of the technologies and fuels deployed by companies like ours will reduce CO_2 emissions. However, this will take time. Our energy infrastructure cannot absorb a rapid shift in the mix of fuels used to generate electricity, and new technologies will require time to be perfected and deployed.

- As a result, sequestration will need to play an important bridging role in the CO_2 reduction efforts of companies like ours. Sequestration – combined with investments in the efficiency of the existing generation fleet – can enable significant near-term action as new generation technologies are developed and deployed over time.

One of the best approaches to sequester carbon currently available is forest restoration. As will be discussed later, forest restoration has the potential to be implemented at a scale that would have a fundamental impact on U.S. energy industry CO_2 emissions. Further, forest restoration provides substantial spin-off benefits, including expanded wildlife habitat, increased recreational opportunities, economic support for the agricultural sector, and the prevention of soil erosion.

However, the current accounting for the sequestration associated with forest restoration makes it a prohibitively expensive way to reduce CO_2 emissions. Unless this accounting is changed, one of the best available near-term tools for CO_2 reduction will produce little more than "showpiece" projects. Just as poor accounting conventions lead to poor investment decisions in the business world, the accounting for forest sequestration will lead to significant under-investment unless modified.

ISSUES WITH THE ACCOUNTING FOR FOREST SEQUESTRATION

Carbon is sequestered in trees over very long time periods – many decades. Business planning time horizons are much shorter – a handful of years. This mismatch is the crux of the problem with the current accounting for forest carbon sequestration.

Figures 1 and 2 depict the rate at which carbon is sequestered in trees in the Lower Mississippi River Valley – one of a number of areas with substantial marginal farmland suitable for forest restoration. As the graphs make clear, a century is required for trees planted in this area to fully achieve their sequestration potential. Roughly thirty-five years are required for the trees to achieve half their eventual sequestration. In the first ten years after planting almost no carbon is sequestered (3% of the eventual total.)

FIGURE 1

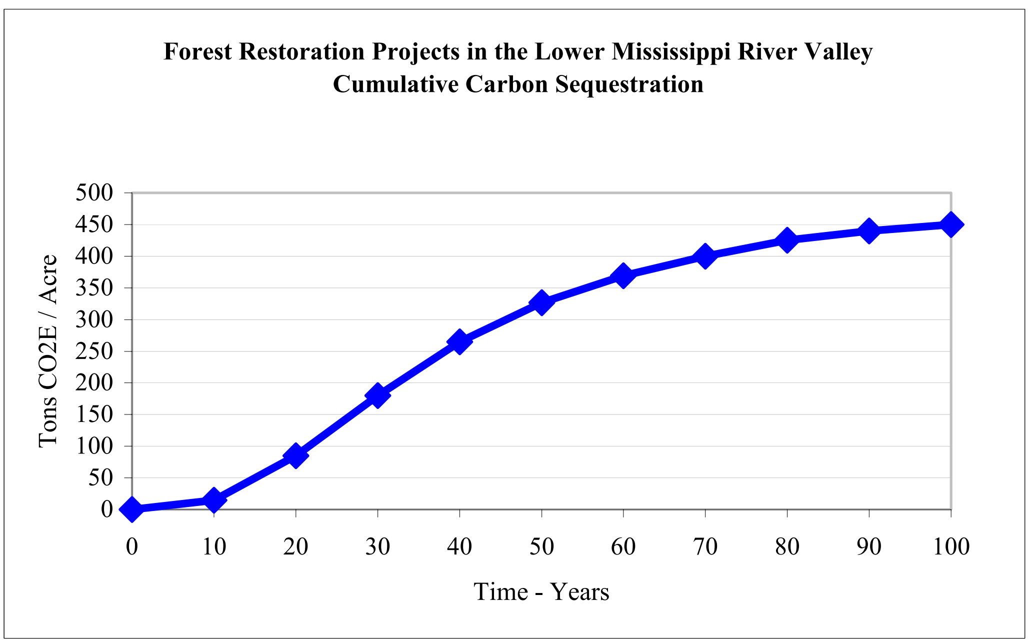
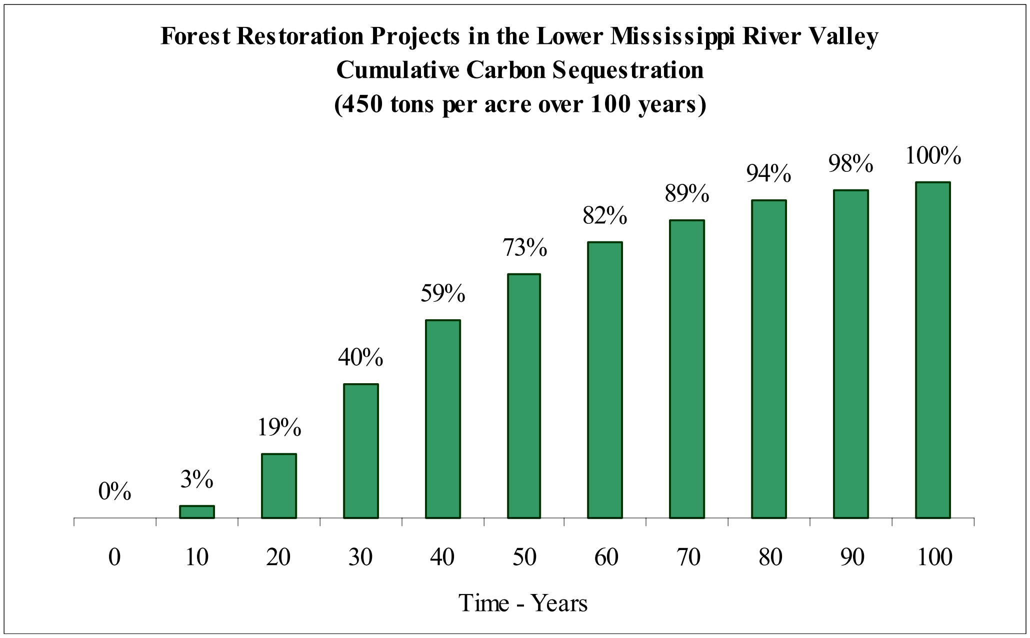


FIGURE 2



In contrast to the long-term time horizon for forest sequestration, most corporations deploy a 3-5 year planning time horizon. Our company plans in great detail one year ahead, develops a working three-year plan, struggles to develop a five-year plan that we really believe, and has never ventured a ten-year financial plan. Although we conduct studies that look five, ten and fifteen years ahead, we know that changes in markets, technology and regulation have a high probability of rendering those studies obsolete.

Given these facts, it is difficult to imagine energy companies (or other industries) investing in forest sequestration, knowing that they would reap the first substantial benefits two to three decades out, and earn the full economic benefit over a century. The probability that events in the intervening years would render the investments economically obsolete is simply too high. This, however, is what the current accounting convention for forest sequestration requires.

At present, a company that plants new forestland to sequester CO_2 receives credit for its investments on a year-by-year basis. Thus, a company that plants an acre of forest in the Lower Mississippi River Valley – an acre that will eventually sequester 450 tons of carbon – is credited with only 14-15 tons sequestered the first decade after the investment is made. Twenty years after tree planting, still only 85 tons (19%) of the eventual 450 tons would be credited.

This accounting methodology requires that companies seeking to utilize forest restoration either (1) adopt a multi-decade business planning time horizon, or (2) plant vast forest acreage to achieve their carbon sequestration goals within a more workable time horizon. The first path is implausible; the second renders forest restoration economically infeasible.

A PROPOSED SOLUTION TO THE ACCOUNTING PROBLEM

Most observers would agree that global climate change is not a phenomenon that will play out over the next five to ten years. Rather, the phenomenon and our efforts to address it will play out over decades – how many decades being a subject of substantial debate.

Developing a sensible accounting policy for forest sequestration requires taking an appropriately long-term view of both global climate change and the manner in which forests mitigate it. Put differently, making forest restoration a viable option requires giving credit up front for tons that will be sequestered in future decades.

Giving current credit for future sequestration would solve the two principle issues associated with the present accounting methodology. Because businesses would know up front the credit they would receive for an investment in forest sequestration, they would not be required to adopt excessively long planning time horizons. Similarly, as will be shown in some detail later, giving current credit for future sequestration makes forest restoration economically workable.

However, giving current credit for future carbon sequestration also introduces two questions that must be addressed:

1. The question of *certainty* – that is, how can one be certain that the future sequestration will actually happen as planned?

2. The question of *timeframe* – that is, how long is it reasonable to wait before CO_2 emitted today is eventually sequestered?

PROVIDING ADEQUATE CERTAINTY IN FOREST SEQUESTRATION

Questions of *certainty* related to awarding current credit for future carbon sequestration revolve around issues such as:

> "How can we be certain that forestland planted today will actually remain forestland in 100 years – that it won't change use?"
>
> "How can we be sure that the amount of CO_2 predicted to be sequestered will, in fact, be sequestered?"
>
> "What happens if the forest that earns credit today burns down several decades from now?"
>
> "How can we be sure that the forestland that receives up-front credit doesn't lead to 'leakage' – i.e., the clearing of forestland elsewhere, or the displacement of the planting of other forestland?"

The first of these questions is in part a legal/contractual issue, and is relatively straightforward to address. There is a large body of contract law relating to land use that can be employed to establish binding, long-term obligations and restrictions. Standard contractual language could be developed to be included in all contracts tied to forest sequestration.

The question of forest fires is essentially a crop insurance issue. Insurance products could be put in place to ensure that, in the case of fire, funds were available to replant the effected acreage.

The third question above – leakage – has been the subject of a great deal of discussion and debate. Clearly, standards would need to be developed to address this question. That said, there are substantial opportunities to pursue forest sequestration on a large scale in projects that have very low probabilities of leakage. For example, much of the acreage available for forest restoration in the Lower Mississippi River Valley is farmland that was cleared of hardwood in the second half of the twentieth century, but now either lies fallow or is economically marginal because its productivity is so poor. Given the substantial inventory of marginal farmland nationwide receiving payments under federal set-aside programs, the likelihood that forest restoration in the Lower Mississippi River Valley would lead to the clearing of forests to create farmland elsewhere in the U.S. is remote at best.

The final question above is one of prediction accuracy. Quite sophisticated methods exist to predict and, eventually, verify the quantity of carbon sequestered in forests. Such methods are currently in use in sequestration projects. No prediction is perfect, of course, and one way to deal with this fact – as well as a number of the other issues addressed in this section – is to discount the up-front credits awarded by a factor less than 100%. This concept will be discussed at some length in the following sections.

ACHIEVING SEQUESTRATION IN A WORKABLE TIMEFRAME

An issue with offsetting current CO_2 emissions via forest restoration is that decades will pass before a significant portion of the targeted emissions will be sequestered. As Figure 2 above shows, 35 years will pass before half of the targeted CO_2 is sequestered. Six decades are required to sequester 80%. A century is required to achieve full sequestration.

As was mentioned earlier, most would agree that climate change is not a phenomenon that will play out over the next five to ten years. However, there is clearly a sentiment in many quarters that waiting a century to achieve full impact is untenable. How long it is workable to wait – the question of sequestration timeframe – is a subject of ongoing study and debate, and is unlikely to be definitively settled anytime soon. In the interim, it would be advisable to develop an approach that makes forest restoration economically viable and achieves carbon sequestration in a timeframe that is reasonable.

One approach to the question of sequestration timeframe is to introduce discounting. Under such an approach, the current sequestration credits awarded for forest restoration would be discounted by a factor less than 100%. Such discounting would have two effects. First, the timeframe to achieve stated carbon sequestration targets would be substantially accelerated. Second, in the long run discounting would lead to "overproduction" – that is, more carbon sequestration than initially targeted.

Take, for example, the application of a 25% CO_2 credit discount rate for forest restoration in the Lower Mississippi River Valley. The additional acreage planted to offset the discounting would lead to the targeted sequestration being achieved in about 50 years, not 100. Further, in the end the acreage would sequester 133% of the CO_2 targeted – an overproduction of 33%.

Naturally, discounting increases the cost of using forest restoration as a carbon sequestration tool. The next section illustrates, the economics of forest sequestration dictate that the discount rate be chosen carefully.

THE IMPACT OF DISCOUNTING ON FOREST RESTORATION COST

Figure 3 shows the relative cost of forest carbon sequestration at various discount levels. This also represents the overproduction achieved (i.e., CO_2 sequestered as a multiple of the target). As discussed above, a 25% discount rate would increase forest restoration costs by a factor of 1.33 and result in 33% more carbon sequestered than targeted. Note that as the discount rate goes up, carbon sequestration costs increase geometrically.

FIGURE 3

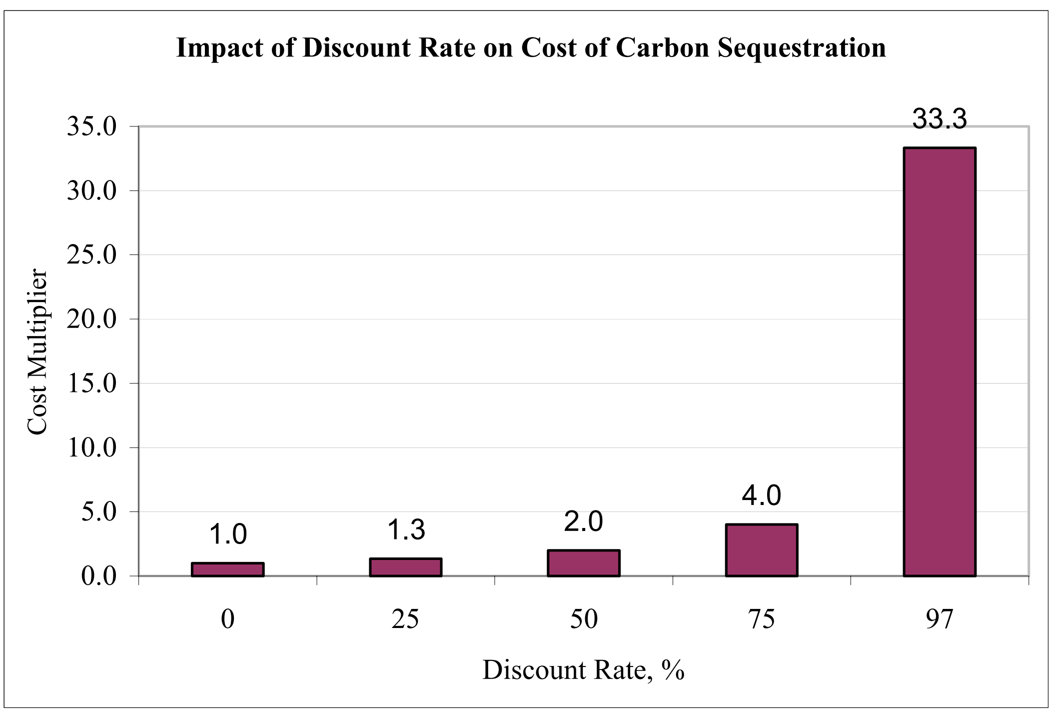


Figure 3 makes it clear why the current accounting convention for forest sequestration is not economically viable. The current policy is most closely approximated by the 97% discount case. To satisfy a short-term carbon sequestration target, both the acreage requirements and forest restoration costs would be 33 times greater than necessary to meet a long-term target. Large-scale investments simply won't happen.

On the other hand, more reasonable discount rates would be more economically viable. For example, the 25% discount rate cost level could be workable, especially if states work with their utilities to allow such costs to be recovered from customers. As the discount rate increases, however, the economics become increasingly untenable. A 75% discount rate, for example, increases forest restoration costs by a factor of 4, which would likely preclude forest restoration as a major climate change action adopted by many companies.

It is worth noting that a number of factors could lead to costs higher than those shown above – e.g., the economics of tree planting in some regions of the country are less attractive than those in the region used in the example. Further, over time the price of marginal land purchased for forest restoration may well rise as the lowest cost options are depleted.

It is also worth noting that higher discount rates are not necessarily "better" from an environmental point of view. As costs increase, the likelihood that companies will pursue more economical, but arguably inferior, CO_2 offsets increases. Credits will be available to purchase from, e.g., Eastern Europe and Russia, but from a domestic policy standpoint, these offsets offer few of the spin-off benefits associated with forest restoration. It is also true that under the voluntary framework proposed by the Administration, raising the cost of sequestration by assigning an artificially high discount rate is likely to lead to companies pursuing less aggressive sequestration goals.

Given the above, we would recommend that a discount rate of 25% be adopted at the outset in regions that approximate the Lower Mississippi River Valley. This would result in workable economics, the achievement of 80% of the targeted sequestration within 40 years, and overproduction in the long run of 33%. A more aggressive discount rate could be adopted in the future if further research on climate change improves our understanding and suggests that shorter time frames are necessary.

THE POTENTIAL SCALE OF FOREST RESTORATION

One of the attractive features of forest restoration is that it has the potential to produce results at a scale that is significant when considered in light of the overall U.S. effort to address climate change. A few facts make this clear:

- The U.S. electric power sector consumes nearly 1 billion tons of coal annually.
- This coal generates about 2.1 billion tons of CO_2.
- It is estimated that there are 5 to 25 million acres of marginal farmland available for forest restoration in the Lower Mississippi River Valley alone.

- Assuming sequestration rates of 450 tons per acre, forest restoration in the Lower Mississippi River Valley could provide 2-11 billion tons of CO_2 offsets.
- The EIA Annual Energy Outlook 2003 reference case projects that electric power sector CO_2 emissions above 2000 levels will total 10 billion tons by 2025 (2 billion by 2014).
- Forest restoration in the Lower Mississippi River Valley could offset this emission increase.

Given that the Lower Mississippi River Valley is only one of many areas with marginal land available for carbon sequestration (albeit one of the most studied,) forest restoration has the potential to make a very material contribution to U.S. efforts to address climate change for several decades.

SUMMARY

When viewed with a wider lens, large-scale forest restoration would represent the reversal of a centuries-old pattern of human impact on forestland. The Lower Mississippi River Valley – which was cut relatively recently, after 1950 – represents a small fraction of the eastern hardwood forest cleared over the past three centuries to enable the spread of agriculture. If CO_2 has the impact on climate that our current understanding suggests, this clearing of the eastern forests must have been one of the most significant climate change events in our country's history. Forest restoration would reverse this impact, while at the same time expanding wildlife habitat, providing recreational opportunities and lending much needed financial support to the agricultural sector.

Of course, forest restoration is ultimately limited in its ability to address the potential impacts of climate change. In the end, investments in new technology will be required. Technology change and the efficient turnover of capital stock require time, though, and forest restoration could provide an important bridging solution in the interim.